SD 11
A 552
no. 23

MISC. PUB. NO. 23

FOREST INSECT CONDITIONS in the INTERMOUNTAIN & NORTHERN ROCKY MOUNTAIN STATES DURING 1959

INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION
REED W. BAILEY, DIRECTOR

FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

OGDEN, UTAH APRIL 1960

LIBRARY
SEP 30 1969
MOUNTAIN

COVER PHOTO

Cessna 180 normally used in aerial surveys over Utah forests

Misc. Pub. No. 23 April 1960

FOREST INSECT CONDITIONS IN THE INTERMOUNTAIN AND NORTHERN ROCKY MOUNTAIN STATES DURING 1959

By

Division of Forest Insect Research

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
Forest Service
U. S. Department of Agriculture
Ogden, Utah
Reed W. Bailey, Director

FOREST INSECT CONDITIONS IN THE INTERMOUNTAIN AND NORTHERN ROCKY MOUNTAIN STATES DURING 1959

INTRODUCTION

The year 1959 in the Intermountain and northern Rocky Mountain states served by the Intermountain Forest and Range Experiment Station was an unusual one for entomologists whose task it is to detect and evaluate the significance of forest insect populations. Continuation of several bark beetle outbreaks during the year, discovery of new ones, and increasing numbers of insect species less commonly found in outbreak form resulted in a busy and interesting program.

Airplanes were again used in examining forested areas to detect possible new infestations and determine spread in previously discovered centers. Ground surveys were conducted to evaluate the seriousness of outbreaks where air examination or reports from cooperators indicated a need. Infestations on lands of all ownerships are included in this report. Cooperation by Forest Service, Department of the Interior, State, and private personnel contributed greatly to over-all coverage and the success of the program.

BARK BEETLES

MOUNTAIN PINE BEETLE

Dendroctonus monticolae Hopk.

The mountain pine beetle is a frequently recorded pest in western white, ponderosa, and lodgepole pine. At the present time there are outbreaks in all three host types.

Stands of old-growth western white pine in northern Idaho and western Montana are chronically infested with mountain pine beetle. These infestations fluctuate in severity from year to year, but the average annual loss ranges from 1 to 5 percent of the stand. White pine stands in parts of the Clearwater National Forest were again infested in 1959 with a tree mortality rate approximating 2-1/2 percent of the white pine trees. Elsewhere in Idaho and western Montana lighter infestations were present in western white pine stands.

Kootenai National Forest personnel in Montana reported approximately 100 ponderosa pine attacked in partially logged areas. These attacks were widely scattered and usually in suppressed trees. An infestation of mountain pine beetle in second-growth ponderosa pine was discovered in and around Atlanta, Idaho, on the Boise National Forest during 1958. During the spring of 1959, 1,397 infested trees were cut, decked, and burned. Fall surveys revealed that possibly 500 to 800 infested trees are still present in the area. An

epidemic of mountain pine beetle in second-growth ponderosa pine has been present in the Crystal Bay area at the north end of Lake Tahoe in Nevada since 1949. The epidemic continues to be rather severe, and during 1957 probably more trees were attacked than had been killed in the preceding 8 years. A cooperative private, State, and Federal control program was undertaken in 1958 and more than 6,000 trees were either logged or burned. No control was carried on in 1959, and surveys late in 1959 revealed that the population had built up so that there are now approximately 8,000 infested trees over an area of approximately 4,000 acres.

Mountain pine beetle activity in lodgepole pine in the northern Rocky Mountains appeared to be at a low level during 1959. One outbreak in Glacier National Park, that has been under observation for several years, decreased 64 percent during the season. This is not the case, however, in the lodgepole pine stands in northern Utah, western Wyoming, and southern Idaho where considerable damage from epidemic infestations is occurring. Of 22 epidemic centers, 8 were included in 1959 chemical control projects, 6 of which have been treated for 2 or more years. Of 12 new centers discovered this year, 6 are isolated spots some distance from the nearest known infestation, while the remainder occur relatively close to previously known outbreak areas. In all but 3 epidemic centers the beetle population is increasing.

In southern Idaho, the mountain pine beetle infestations occur on the Sawtooth and Targhee National Forests and on State and private lands near Kilgore. In Wyoming, epidemic populations are on the Teton National Forest and in Grand Teton National Park. The extensive outbreak on the Wasatch National Forest in Utah continues, as does the small but threatening infestation on the Ashley National Forest in Utah.

Control efforts have been successful in reducing populations in treated areas, but the appearance of new centers of infestation and expansion of older centers indicates the seriousness of the present mountain pine beetle problem in lodgepole forests of the Intermountain States.

ENGELMANN SPRUCE BEETLE

Dendroctonus engelmanni Hopk.

The Engelmann spruce beetle is recognized as a very destructive pest of Engelmann spruce in our area. Records show that many outbreaks have occurred in the past. During 1952, in northern Idaho and western Montana, a very extensive and serious outbreak started. In 1959 the species was still active in many of the spruce stands, and while there are indications of decreased beetle activity in most of these previously infested drainages, an outbreak in the Kootenai National Forest increased alarmingly. Persistent infestations are nearly all associated with logging areas and are remnants of the outbreak in 1952.

During the past few years, in southern Idaho and Utah, several serious outbreaks have developed and considerable effort has been expended, through logging and chemical treatment, to reduce the losses and prevent expansion of

the infested areas. An outbreak on the Bridger National Forest is the oldest of the most recent spruce beetle outbreaks in the Intermountain states. Since 1955, logging, chemical treatment, and falling of trap trees have been employed to contain a serious epidemic. Natural control factors, including woodpeckers and parasites of the genus Coeloides, have increased their effectiveness recently. In spite of this, however, it seems unlikely that existing natural control factors can kill enough beetles to reverse the infestation trend.

In June of 1958 a serious outbreak was detected in the high country of the Uinta National Forest where it joins the Ashley and Wasatch National Forests in Utah. A program of logging and treating was started immediately and still continues. As a result of logging and chemical treatment in 1958 and 1959, Engelmann spruce beetle populations on the eastern side of Mt. Peale on the Manti-LaSal Forest in Utah have been greatly reduced. Populations at present, however, still have the potential for causing considerable numbers of new attacks, and further control efforts are indicated.

A small Engelmann spruce beetle infestation covering approximately 700 acres on the Aquarius Plateau in the Dixie National Forest continues at a moderately high level. Stands on the Aquarius Plateau have a long history of spruce beetle activity. Control measures were undertaken in 1958 but none was undertaken in 1959. Examinations late in 1959 revealed moderately high residual populations and indicated that these populations probably will continue to increase unless additional control work is undertaken.

WESTERN PINE BEETLE

Dendroctonus brevicomis Lec.

The western pine beetle appears to have been more active in 1959 than had been observed during the past few years. While no single outbreak has serious proportions, it has been noted that grouping of attacks on ponderosa pine is becoming more noticeable in Montana and in southern Idaho.

BLACK HILLS BEETLE

Dendroctonus ponderosae Hopk.

Infestations of Black Hills beetle on the Dixie National Forest and in Bryce Canyon National Park, southern Utah, have been significantly reduced by direct control. The downward trend observed during 1958 continued in 1959. Severe drought conditions were experienced this year, and in spite of the downward trend it is felt that without continued control effort remaining infestations could reverse this trend if severe drought persists.

DOUGLAS-FIR BEETLE

Dendroctonus pseudotsugae Hopk.

Reports during 1958 indicated an upward trend in populations of Douglas-fir beetle in southern Idaho and Utah. During 1959 this increasing trend was particularly evident in southern Idaho stands of Douglas-fir, whereas in western Wyoming the upward trend was less noticeable. The outbreak on the Dixie National Forest in southern Utah continued at a high level. Several reports of Douglas-fir beetle activity were received during 1959 in Montana. Logging of infested timber in the Swan River Valley was started during the year. Some small areas of bark beetle activity were noted in Montana but other than in Swan River Valley there were no large outbreaks such as have occurred in the past.

ENGRAVER BEETLES

Ips species

Several outbreaks of secondary bark beetles, mostly Ips species, were reported during the year in Montana and northern Idaho. Many of these infestations were of Ips oregonis (Eichh.) in ponderosa pine. Activity of secondary insects appears to have increased during the year.

DEFOLIATORS

SPRUCE BUDWORM

Choristoneura fumiferana (Clem.)

The spruce budworm continues to lead the group of defoliators in the forests of the area. The epidemic that has plagued Douglas-fir forests in central Montana for more than 10 years continues with little noticeable change. Most of the available Douglas-fir type east of the Continental Divide is somewhat infested and much of the acreage sprayed in 1953 and from 1955 through 1957 to control the budworm is again repopulated to varying degrees.

Ground surveys in Montana showed an average of 36 percent defoliation of needles in 1959 compared with 48 and 49 percent during the preceding 2 years. Following is a summary of budworm conditions in central Montana:

Infested 1947 to 1959--5,888,000 acres
Controlled by aerial spraying--2,169,049 acres
Reduced to endemic level by natural control--276,000 acres
Uncontrolled 1959--3,442,951 acres

In southern Idaho from 1952 to 1957 infestations of budworm increased both areawise and in intensity, and during this period 2,029,747 acres of Douglas-fir and true firs were aerially sprayed to control this insect. In 1958, damage levels increased only in limited areas. Budworm infestations during 1959 in southern Idaho have either decreased or remained static in size and intensity. A few small exceptional areas show an increasing trend. Area infested in 1959 totals 499,000 acres and occurs on the Payette, Salmon, Sawtooth, and Targhee National Forests. Of this total only 59,000 acres were classified as heavy.

Aerial detection surveys in 1959 on the Salmon National Forest revealed a change in the pattern of infestation. For the first time in 5 years defoliation occurred in smaller broken areas, rather than in large continuous blocks. Ground examinations revealed a decrease in intensity of defoliation. In 1958, 100,000 of the 478,000 acres infested showed more than 75 percent defoliation. In 1959, only 10,000 of the 165,000 acres were judged to be that severe.

The general budworm situation in southern Idaho in 1959 appears to have relative stability at a population damage level that is less serious than it has been during the past few years.

LARCH CASEBEARER

Coleophora laricella (Hbn.)

The larch casebearer is now spread over practically all of northern Idaho and northeastern Washington. The total area included within these limits is 8,000 square miles or twice the area of infestation that was found last year. In contrast to the over-all rate of spread of the larch casebearer, the area of heavy infestation remained about the same in 1959 as it was in 1958. Visible defoliation extends over 15,000 to 20,000 acres in the vicinity of St. Maries, Idaho.

Observations and collections of casebearer during the last several years show that the extent of natural control by parasites is insignificant. Since the larch casebearer is a relatively new introduction into western areas, it is planned to collect parasites in the eastern areas where the species has been present for many years and liberate them in this infestation in the West.

LODGEPOLE PINE NEEDLE MINER

Recurvaria milleri Busck.

The lodgepole needle miner is an important insect pest of lodgepole pine forests in the Intermountain area. An infestation reported on the Sawtooth National Forest in Idaho in 1938 subsided in 1943. During 1949 another infestation built up over most of the lodgepole stands on the Sawtooth, Targhee, and Caribou National Forests, but this outbreak died out in 1953. Present

infestations were detected in the fall of 1958. There are extensive infestations on the Sawtooth and Targhee National Forests, with a number of lesser infestations on the Bridger and Caribou National Forests. The lodgepole needle miner outbreak has increased in area and intensity and now covers about 104,000 acres. Evaluations indicate that this insect's activity probably will continue to increase for the next few years.

PANDORA MOTH

Coloradia pandora Blake

Pupae of pandora moth in soil

In mid-June of 1959 large greenish-brown larvae were sent to the Division of Forest Insect Research by members of a Station timber survey crew. Their report stated that numerous caterpillars were feeding on lodgepole pine stands along the north slopes of the Uinta Mountains on the Ashley National Forest. These caterpillars were identified as larvae of the pandora moth, a pest that occurs in epidemic numbers only at relatively long intervals.

Inspection of the area revealed the infestation covered approximately 15,000 acres extending along both sides of the main road from the Summit Springs Ranger Station through Hickerson Park.

An evaluation of this infestation revealed a heavy population of mature caterpillars. The larvae appeared to feed more or less en masse; large numbers would strip one tree and then migrate to another. Some caterpillars had the symptoms of a wilt disorder. To get a better picture of the damage and to assess the overwintering population, a second examination was made early in September. About 300 acres were considered to be severely defoliated; in this area about 1 percent of the trees were completely stripped of foliage, and the remainder of the trees were less severely defoliated. Efforts to sample the overwintering pupae in the ground showed that the distribution was far from uniform. Only rarely were pupae found beneath the crown of lodgepole pine; instead they were found in the sunny openings within the stand where grass and other low-growing vegetation was present or wherever the soil and duff had been disturbed, as around uprooted trees, road cuts, and animal burrows. Of the pupae collected during this examination about 4 percent was putrified, possibly because of the presence of a pathogen. No evidence of predation by small mammals was noted.

Since the pandora moth has a 2-year cycle and during the year 1960 will overwinter as young larvae, there will probably be a very limited amount of defoliation during the summer. It will be possible to determine more closely the probability of heavy feeding during the following year and if necessary consider control possibilities.

MISCELLANEOUS SAWFLIES

The year 1959 saw an upsurge of various species of sawflies from Nevada north through Montana. At least six different species were collected from various host trees, including Douglas-fir, ponderosa pine, limber pine, lodgepole pine, and larch in the northern Rocky Mountain area. Five sawfly infestations were discovered in southern Idaho and Nevada this year, one in lodgepole pine, one in pinyon pine, and three in Douglas-fir. At least three species of sawflies are involved in these infestations.

An outbreak of Neodiprion species in lodgepole and ponderosa pine in and adjacent to the Lewis and Clark National Forest in Montana severely defoliated approximately 7,000 acres of overstory trees. An evaluation of this outbreak indicates the possibility of a downward trend.

Pristiphora erichsonii (Hartig.) was detected in 1958 near Missoula, Montana, for the first time since 1944. Several large patches of western larch in the Blackfoot River drainage were defoliated but no tree mortality has resulted.

Sawfly larvae on grand fir

In 1958 two new species of Pristiphora were reared from western larch near Sandpoint, Idaho. A major difference between these insects and P. erichsonii is that they pupate on the foliage whereas P. erichsonii pupates in the duff.

A light infestation of sawflies on lodgepole and larch was first observed in 1958 around Cascade Reservoir in Idaho. In 1959 populations of larvae, particularly on lodgepole pine, had increased to such numbers that practically all old-growth needles were stripped from the trees on about 5,000 acres. Counts of pupae per square foot of duff indicated that the lodgepole pine

sawfly increased more than eight times from 1958 to 1959. However, rearings of pupae produced only 50 percent emergence, and approximately 12 percent of the larvae failed to pupate, probably because of a virus.

A sawfly infestation on Douglas-fir was discovered in 1956 within the Craters of The Moon National Monument in Idaho. The following year this infestation subsided, but additional low-level infestations were discovered in other areas throughout the South Fork of the Boise River and in Warm Springs Creek drainages on the Sawtooth National Forest and within Douglas-fir stands on private, State, and Bureau of Land Management land in Owyhee County. These infestations have remained at an endemic level except for approximately 300 acres that were heavily defoliated on the Sawtooth National Forest.

In May of 1959 a sawfly infestation was reported on Bureau of Land Management lands north of Pioche, Nevada, on pinyon pine. Examination revealed that approximately 75 square miles of pinyon pine are currently infested. The outbreak apparently started in the vicinity of Hulse Canyon, and 90 percent of the pinyon pine in this immediate area is dead. Over the remainder of the infested area defoliation ranged from 10 to 100 percent in the larger trees to 100 percent in smaller trees. While examination of the pupae revealed some evidence of natural control factors, it does not appear that these factors are sufficient to reduce next year's population greatly. The species is rather important in this area because pinyon pine has become a very important Christmas tree species, and obviously none can be cut for this purpose.

ASPEN LEAF MINER

Phyllocnistis populiella Chamb.

The aspen leaf miner has been a serious defoliator of aspen within western Wyoming and southeastern Idaho for the past 10 to 12 years. This infestation covers nearly all of the aspen on the Bridger, Teton, Targhee, and Caribou National Forests and Grand Teton National Park. As a result of repeated defoliation by the mining larvae, tree mortality has occurred in patches. A majority of the infested aspen produces only stunted foliage and shows signs that tree mortality may continue during succeeding years.

TUSSOCK MOTHS

Several outbreaks of tussock moth have occurred in Idaho and Nevada during the past 5 years. It appears that more than one species is involved but determinations have not been received from taxonomists. A Douglas-fir tussock moth outbreak began in 1956 in Owyhee County, Idaho, and increased sharply in 1957 but was virtually eliminated in 1958 primarily as a result of a virus disease. Only one small drainage remains infested at a low population level in 1959.

An infestation of tussock moth on bitterbrush was first reported in June 1958 near Carson City, Nevada, and has since been under observation. Part of the area has been used for experimental tests with virus material obtained from Douglas-fir tussock moth in Idaho. These tests proved that this virus could be established at an application rate of 10 million polyhedra per acre, and good mortality could be obtained the first year at the rate of 50 million polyhedra per acre. Bitterbrush has suffered some twig killing but during the past 2 years has managed to produce two crops of leaves annually, and no appreciable mortality is expected.

Approximately 5,000 to 10,000 acres of ceanothus, willow, bitterbrush, ninebark, ribes, and rosebrush were infested by a tussock moth during the summer of 1959 at Idaho City. The occurrence of a virus disease during this first year of noticeable infestation was unusual and practically eliminated the population.

Normal bitterbrush foliage

Bitterbrush defoliated by tussock moth larvae

An unusual situation was noted this year by Dr. James L. Mielke, forest pathologist. In July, on the Targhee National Forest in Idaho, he observed a tussock moth feeding on dwarfmistletoe on lodgepole pine. When entomologists examined the infestation in July larvae were pupating. There was no evidence of feeding on lodgepole foliage. Dr. Mielke stated that the feeding that occurred could prevent seed formation for about 2 years. The species of tussock moth has not been determined.

PINE TIP MOTH

Rhyacionia sp.

Deformity of ponderosa pine resulting from pine tip moth damage

Infestations of pine tip moth have persisted for many years in the Long Pine and Sioux Divisions of the Custer National Forest in Montana and South Dakota. Severe damage is concentrated in dense patches of ponderosa reproduction where the affected trees are deformed and stunted from successive years of damage to the terminals by pine tip moth larvae.

Stunted Engelmann spruce trees in the Kishenehn Creek drainage, Glacier National Park, Montana, were found infested by spruce weevil, *Pissodes engelmanni* Hopk.

PINE RESIN MIDGE

Retinodiplosis sp.

Pine resin midge was active in many parts of the northern Rocky Mountain region in 1959. Plantations covering several thousand acres in the Kaniksu National Forest in Idaho suffered considerable damage to lateral branch tips. Some tree mortality from a combination of midge damage and other factors was observed.

Terminal damage caused by pine resin midge on ponderosa pine

SUCKING INSECTS

MEALYBUG

An infestation of mealybugs in true firs was reported in 1958 north of Hazard Lake on the Payette National Forest in Idaho. Evidence indicated that a large population had been feeding throughout the growing season. Affected trees were alpine fir, lodgepole pine, Engelmann spruce, and white bark pine. Deposits of a black sooty mold were characteristic throughout the infested area, but underneath this mold the needles were alive and green but showed scattered feeding injury. Occasional twig killing was noted but the damage was assessed as light. In 1959 the infestation at Hazard Lake had disappeared completely, but some 5 to 10 air miles west, around Elk Lake, a similar but less intense outbreak was discovered.

SPRUCE MEALYBUG

Puto sp.

A spruce mealybug infesting Engelmann spruce stands in southern Utah is still very active. The infestation covers about 60,000 acres in three locations: Thousand Lake Mountain, near Loa, Utah, on the Fishlake National Forest; Griffin Springs on the Aquarius Plateau, and Barney Top on the Dixie National Forest. There is considerable tree deformity, limb killing, and reduced vigor in areas where the pest has been active for several years. In the older infestation on Thousand Lake Mountain some mortality to reproduction is occurring. The infestations continue at epidemic levels. As far as is known this particular species occurs only in this area.